



MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

VOL. XLI.

FEBRUARY 11, 1881.

No. 4.

J. R. HIND, Esq., F.R.S., President, in the Chair.

W. H. St. Quintin Gage, Esq., Eastbourne;

O. Theodor Olsen, Esq., 40 Cleethorpe Road, Grimsby; and
James George Vine, Esq., Rosslyn House, Bromfelde Road,
Clapham, S.W.;

were balloted for, and duly elected Fellows of the Society.

REPORT OF THE COUNCIL TO THE SIXTY-FIRST ANNUAL GENERAL MEETING OF THE SOCIETY.

The following table shows the progress and present state of
the Society:—

	Compounders	Annual Subscribers	Non-resident	Mathematical Society	Total Fellows	Associates	Patron	Grand Total
December 31, 1879 ...	214	368	4	5	591	43	1	635
Since elected	+ 6	+ 20	...	...	...	...	...	...
Deceased	- 2	- 7	- 1	...	...	- 2	...	...
Removals	+ 3	- 3
Resigned	- 1	- 4
Expelled	- 11
December 31, 1880 ...	220	363	3	5	591	41	1	633

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Mr. Barrow's Account as Treasurer of the Royal

RECEIPTS.

Astronomical Society, from Dec. 31, 1879, to Dec. 31, 1880.

EXPENDITURE.

Salaries:	£	s.	d.	£	s.	d.
Editor of <i>Monthly Notices</i>	60	0	0			
Assistant Secretary	225	0	0			
				285	0	0
Income Tax and House Duty		9	3	9		
Fire Insurance		7	16	6		
Printing: Spottiswoode & Co.	331	12	0			
Hazell, Watson, & Viney	326	4	10			
				657	16	10
Lithography and Engraving		9	10	0		
Turnor Fund: Books purchased during year ...		30	12	2		
Library Expenses: Binding	40	8	10			
Library Catalogue	45	0	0			
				85	8	10
House expenses	31	16	9			
Wages	31	14	0			
Stamps and postage	57	1	4			
Carriage of books and parcels		5	9	10		
Stationery and office expenses	13	12	2			
Expenses of meetings	20	0	0			
Coals and gas	57	10	6			
Fittings in hall and stock room	29	15	2			
Sundry fittings and repairs	8	1	3			
Whitewashing, papering, &c.	17	2	0			
Sundries	9	2	5			
				281	5	5
Mrs. Jackson-Gwilt's annuity		8	19	0		
Due to Assistant Secretary on Petty Cash account,						
Jan. 1, 1880				1	4	5
Balance at Bankers', Dec. 31, 1880	317	14	10			
,, in hand of Assistant Secretary on account						
of Turnor Fund	12	5	6			
				330	0	4
				£1,706	17	3

Examined and found correct, Jan. 6, 1881.

J. RAND CAPRON,
A. M. W. DOWNING.

Assets and present property of the Society, January 1, 1881:—

	£ s. d.	£ s. d.
Balance at Bankers', Dec. 31, 1880	317 14 10	
,, in hand of Assistant Secretary on account of Turnor Fund	12 5 6	
	330 0 4	
Less amount due to Assistant Secretary on Petty Cash account	5 4 0	
	324 16 4	
Due on account of Subscriptions:		
1 Contribution of 4 years' standing ...	8 8 0	
14 ,, 3 ,, 	88 7 4 0	
31 ,, 2 ,, 	130 4 0	
49 ,, 1 ,, 	102 18 0	
3 Admission Fees and First Contributions...	9 9 0	
Various amounts	8 8 0	
	347 11 0	
Less 3 Contributions paid in advance ...	6 6 0	
	341 5 0	
Due for Publications	18 0 9	
,, from Williams & Norgate for sales during 1880	76 8 5	
	94 9 2	

£7,500 Consols, including the Lee Fund (£300), the Turnor Fund (£450), and the Horrox Memorial Fund (£100).

£5,700 New 3 per cent. Stock, including Mrs. Jackson-Gwilt's gift (£300).

Astronomical and other MSS., Books, Prints, Instruments, &c.

Unsold Publications of the Society.

Five Gold Medals.

Report of the Auditors.

We, being two of the duly appointed Auditors, beg to lay before this General Meeting of the Royal Astronomical Society the following Report:—

1. We have examined the Treasurer's account, and an account of the assets and property of the Society, and have found and certified the same to be correct.
2. The receipts and expenditure for the past year are as stated in the Treasurer's account.
3. The cash in hand on December 31, 1880, including the balance at the bankers', amounted to 330*l.* 0*s.* 4*d.*

4. The funded property of the Society is the same as at the end of last year, and is in a satisfactory state.

5. We have laid on the table a list of the names of those Fellows who are now in arrear for sums due at the last Annual General Meeting, with the amount due against each Fellow's name.

J. RAND CAPRON,
A. M. W. DOWNING.

Stock in hand of volumes of the *Monthly Notices* :—

Vol.	At Society's Rooms	At Williams & Norgate's	Vol.	At Society's Rooms	At Williams & Norgate's
I.	78	1	XXII.	35	...
II.	78	2	XXIII.	32	...
III.	...	...	XXIV.	24	...
IV.	...	...	XXV.	7	...
V.	...	...	XXVI.	11	...
VI.	44	1	XXVII.	3	...
VII.	2	...	XXVIII.	76	...
VIII.	142	2	XXIX.	54	1
IX.	24	3	XXX.	68	4
X.	150	2	XXXI.	99	2
XI.	186	2	XXXII.	122	4
XII.	12	2	XXXIII.	106	3
XIII.	152	3	XXXIV.	84	5
XIV.	110	3	XXXV.	70	1
XV.	129	2	XXXVI.	39	1
XVI.	110	1	XXXVII.	46	2
XVII.	137	1	XXXVIII.	107	5
XVIII.	167	...	XXXIX.	113	2
XIX.	67	...	XL.	126	6
XX.	31	...	Index to } {} <i>Monthly</i> {} <i>Notices</i>		597
XXI.	20	...			...

In addition to the above volumes of the *Monthly Notices*, the Society has a considerable stock of separate numbers of nearly all the volumes. With the exception, however, of Vols. XXXVI. to XL., no complete volumes can be formed from the separate numbers in stock.

Stock in hand of volumes of the *Memoirs* :—

Vol.	At Society's Rooms	At Williams & Norgate's	Vol.	At Society's Rooms	At Williams & Norgate's
I. Part 1	7	...	XXIII.	157	1
I. Part 2	44	...	XXIV.	164	2
II. Part 1	57	...	XXV.	176	2
II. Part 2	23	...	XXVI.	180	2
III. Part 1	70	...	XXVII.	435	1
III. Part 2	89	...	XXVIII.	392	1
IV. Part 1	85	3	XXIX.	421	...
IV. Part 2	94	3	XXX.	170	...
V.	110	4	XXXI.	151	2
VI.	129	3	XXXII.	167	2
VII.	153	3	XXXIII.	173	1
VIII.	132	4	XXXIV.	172	7
IX.	140	4	XXXV.	119	4
X.	152	1	XXXVI. (with M.N.)	206	13
XI.	160	...	XXXVI. (without)	5	...
XII.	167	...	XXXVII. Part 1	357	8
XIII.	174	...	XXXVII. Part 2	305	6
XIV.	373	3	XXXVIII.	293	2
XV.	146	1	XXXIX. Part 1	266	4
XVI.	177	...	XXXIX. Part 2	275	5
XVII.	154	3	XL.	306	2
XVIII.	158	...	XLI.	493	5
XIX.	162	...	XLII.	271	6
XX.	161	2	XLIII.	297	3
XXI. Part 1	314	...	XLIV.	312	6
XXI. Part 2	99	...	XLV.	488	5
XXI. 1 & 2 (together)	67	1	Index to <i>Memoirs</i>	663	2
XXII.	162	1			

Instruments belonging to the Society.

No. 1. The *Harrison* clock.
 , , 2. The *Owen* portable circles, by *Jones*.
 , , 3. The *Beaufoy* circle.
 , , 4. The *Beaufoy* transit instrument.
 , , 5. The *Herschel* 7-foot telescope.

No. 6. The *Greig* universal instrument, by Reichenbach and Ertel. The transit telescope, by Ultzschneider and Fraunhofer, of Munich.

„ 7. The *Smeaton* equatoreal.

„ 8. The *Cavendish* apparatus.

„ 9. The 7-foot Gregorian telescope (late Mr. Shearman's).

„ 10. The variation transit instrument (late Mr. Shearman's).

„ 11. The universal quadrant, by Abraham Sharp.

„ 12. The *Fuller* theodolite.

„ 13. The standard scale, by Troughton and Simms.

„ 14. The *Beaufoy* clock, No. 1.

„ 15. The *Beaufoy* clock, No. 2.

„ 16. The *Wollaston* telescope.

„ 17. The *Lee* circle.

„ 18. The *Sharpe* reflecting circle.

„ 19. The *Brisbane* circle.

„ 20. The *Baker* universal equatoreal.

„ 21. The *Reade* transit.

„ 22. The *Matthew* equatoreal, by Cooke.

„ 23. The *Matthew* transit instrument.

„ 24. The *South* transit instrument.

„ 25. A quadrant, by Bird (formerly belonging to Captain Cook).

„ 26. A globe showing the precession of the equinoxes.
The *Sheepshanks* collection :—

„ 27. (1) 30-inch transit instrument, by Simms, with level and two iron stands.

„ 28. (2) 6-inch transit theodolite, with circles divided on silver; reading microscopes, both for altitude and azimuth; cross and siding levels; magnetic needle; plumbline; portable clamping foot and tripod stand.

„ 29. (3) $4\frac{6}{10}$ -inch achromatic telescope, about 5 feet 6 inches focal length; finder; rack motion; double-image micrometer; two other micrometers; object-glass micrometer; one terrestrial and ten astronomical eyepieces, applied by means of two adapters, with equatoreal stand, clock movement.

„ 30. (4) $3\frac{1}{4}$ -inch achromatic telescope, with equatoreal stand; double-image micrometer; one terrestrial and three astronomical eyepieces.

„ 31. (5) $2\frac{3}{4}$ -inch achromatic telescope, with stand; one terrestrial and three astronomical eyepieces.

„ 33. (7) 2-foot navy telescope.

„ 34. (8) A transit instrument of 45 inches focal length; with iron stand, and also Ys for fixing to stone piers; two axis levels.

„ 35. (9) Repeating theodolite, by Ertel, with folding tripod stand.

No. 36. (10) 8-inch pillar sextant, by Troughton, divided on platinum, with counterpoise stand and artificial horizon.

„ 37. (11) Portable zenith telescope and stand, $2\frac{3}{4}$ -inch aperture and 26 inches focal length; 10-inch horizontal circle and 8-inch verticle circle, read to $10''$ by two verniers to each circle.

„ 38. (12) 18-inch Borda repeating circle, by Troughton, $2\frac{1}{8}$ -inch aperture and 24 inches focal length; the circles divided on silver, the horizontal circle being read by four verniers, and the vertical circle by three verniers, each to $10''$.

„ 39. (13) 8-inch vertical repeating circle, with diagonal telescope, by Troughton and Simms; circle divided on silver, reading to $10''$; a 5-inch circle at eye-end reading to single minutes; horizontal circle 9 inches diameter in brass, reading to single minutes.

„ 40. (14) A set of surveying instruments, consisting of a 12-inch theodolite for horizontal angles only, reading to $10''$; two sets of adjusting plates; tripod stand with enclosed telescope; heavy stand for theodolite; Y piece of level; two large and three small ground-glass bubbles divided; level collimator, object-glass $1\frac{5}{8}$ -inch diameter and 16 inches focal length; micrometer eyepiece, comb, and wires; mercury bottle and trough.

„ 41. (15) Level collimator with object-glass $1\frac{7}{8}$ -inch diameter and 16 inches focal length; stand, rider-level, and fittings.

„ 42. (16) 10-inch reflecting circle, by Troughton, reading by three verniers to $20''$; counterpoise stand; artificial horizon with mercury; two tripod stands.

„ 43. (17) Hassler's reflecting circle, by Troughton, with counterpoise stand.

„ 44. (18) 6-inch reflecting and repeating circle, by Troughton and Simms, contained in three boxes, two of which form stands. Circle divided on silver, reading to single minutes; two inside arcs divided to single degrees, 150 degrees on each side; artificial horizon and mercury.

„ 45. (19) 5-inch reflecting and repeating circle, by Lenoir, of Paris.

„ 46. (20) Reflecting circle, by Jecker, of Paris, 11 inches in diameter, with one vernier reading to $15''$.

„ 47. (21) Box sextant; reflecting plane and level.

„ 48. (22) Prismatic compass, by Troughton and Simms.

„ 49. (23) Mountain barometer.

„ 50. (24) Prismatic compass, by Thomas Jones, mounted with a cylindrical lens.

„ 51. (25) Ordinary $4\frac{1}{2}$ -inch compass with needle.

No. 52. (26) Dipping needle, by Robinson.
,, 53. (27) Compass needle, mounted for variation.
,, 54. (28) Magnetic intensity needle, by Meyerstein, of Göttingen; a strongly fitted brass box with heavy magnet; filar suspension.
,, 55. (29) Box of magnetic apparatus.
,, 56. (30) Hassler's reflecting circle, by Troughton; a $10\frac{1}{2}$ -inch reflecting and repeating circle, with stand and counterpoise, divided on platinum with two movable and two fixed indices; four verniers reading to $10''$.
,, 57. (31) Box sextant and glass plane artificial horizon, by Troughton and Simms.
,, 58. (32) Plane $2\frac{3}{4}$ -inch speculum, artificial horizon, and stand.
,, 59. (33) $2\frac{1}{2}$ -inch circular level horizon, by Dollond.
,, 60. (34) Artificial horizon, roof, and trough; the trough $8\frac{1}{4}$ by $4\frac{1}{2}$ inches. Tripod stand.
,, 61. (35) Set of drawing instruments, consisting of 6-inch circular protractor and common protractor, T-square: one beam compass.
,, 62. (36) A pentagraph.
,, 63. (37) A noddy.
,, 64. (38) A small Galilean telescope with object-glass of rock crystal.
,, 65. (39) Five levels.
,, 66. (40) 18-inch celestial globe.
,, 67. (41) Varley stand for telescope.
,, 69. (43) Telescope, with the object-glass of rock crystal.
,, 70. Portable equatoreal stand.
,, 71. Portable altazimuth tripod.
,, 72. Four polarimeters.
,, 74. Registering spectroscope, with one large prism.
,, 76. Two five-prism direct-vision spectroscopes.
,, 78. $9\frac{1}{4}$ -inch silvered-glass reflector and stand, by Browning.
,, 79. Spectroscope.
,, 80. A small box, containing three square-headed Nicol's prisms; two Babinet's compensators; two double-image prisms; three Savarts; one positive eyepiece, with Nicol's prism; one dark wedge.
,, 81. A back-staff, or Davis' quadrant.
,, 82. A nocturnal or star dial.
,, 83. An early non-achromatic telescope, of about 3 feet focal length, in oak tube, by Samuel Scatliffe, London.
,, 84. A Hollis observing chair.
,, 85. A double image micrometer, by Troughton and Simms.

No. 86. A $4\frac{1}{2}$ -inch Gregorian reflecting telescope, by Short, with altazimuth stand and 6-inch altitude and azimuth circles and two eyepieces.
 ,, 87. A $3\frac{1}{4}$ -inch Gregorian reflecting telescope with wooden tripod stand.
 ,, 88. A pendulum with 5-foot brass suspension rod, working on knife edges, by Thomas Jones.
 ,, 89. A Rhabdological Abacus. A contrivance invented by Mr. H. Goodwyn, consisting of a box filled with compartments, in which are square rods covered with numbers, which can be arranged so as to facilitate the labour of multiplying high numbers.
 ,, 90. An Arabic celestial globe of bronze, not quite 6 inches in diameter.
 ,, 91. An astronomical time watchcase, by Professor Chevallier.
 ,, 92. A 2-foot protractor, with two moveable arms, and vernier.
 ,, 93. A beam compass, in box.
 ,, 94. A 2-foot navigation scale.
 ,, 95. Stand for testing measures of length.
 ,, 96. Artificial planet and star, for testing the measurement of a fixed distance at different position angles.
 ,, 97. A 12-cell Leclanché battery.

The following instruments have been presented to the Society by Mrs. Walter:—

No. 98. A 2 feet 6 inch navy telescope with object glass $2\frac{1}{2}$ inches, by Cooke, with portable wooden tripod stand.
 ,, 99. A 12-inch transit instrument, by Fayerer & Son, with level and portable stand.
 ,, 100. A 9-inch transit instrument, with level and iron stand.
 ,, 101. A sun-dial, by G. Adams, London.
 ,, 102. A sun-dial, by Troughton.
 ,, 103. A sun-dial, by Casella.
 ,, 104. A sun-dial.
 ,, 105. A box sextant, by Troughton and Simms.
 ,, 106. An azimuth compass, by Schmalcalder, London.
 ,, 107. An azimuth compass, by C. Earle, Melbourne.
 ,, 108. An azimuth compass, by Negretti and Zambra.
 ,, 109. A dipleidoscope, by E. Dent.
 ,, 110. An Abney level, by Elliott.
 ,, 111. A pocket spectroscope, by Browning.

The following instruments are lent, during the pleasure of the Council, to the undermentioned persons:—

No. 4. The *Beaufoy* transit instrument, to the Observatory, Kingston, Canada.
 ,, 12. The *Fuller* theodolite, to the Director of the Sydney Observatory.

No. 22. The *Matthew* equatoreal, to Mr. Brett.
„ 23. The *Matthew* transit, to Captain Noble.
„ 74. Registering spectroscope, with prism, to Mr. Lecky.
„ 76. One 5-prism spectroscope, to Mr. Plummer.
„ 78. The 9 $\frac{1}{4}$ -inch reflector, to Mr. Neison.

From the *Sheepshanks* collection:—

No. 29. (3) Parallel wire micrometer, to the Rev. W. C. Bruce.
„ 30. (4) 3 $\frac{1}{4}$ -inch equatoreal and stand, to Mr. Sadler.
„ 31. (5) 2 $\frac{3}{4}$ -inch telescope and stand, to Mr. Birt.
„ 34. (8) Transit instrument, to the Rev. Professor Pritchard.
„ 35. (9) Repeating theodolite, to the Sydney Observatory.
69. (43) Telescope, with rock-crystal object-glass, to Dr. Huggins.

The Gold Medal.

The Council have awarded the Society's Gold Medal to Professor Axel Möller, for his investigations of the motion of Faye's Comet. The President will lay before the Society the grounds upon which this award has been founded.

Publications of the Society.

Vol. XLV. of the *Memoirs* has been published during the past year. It contains the following papers:—

M. Souillart, 'Théorie analytique des mouvements des Satellites de Jupiter.'

W. H. M. Christie, 'On the Systematic Errors of the Greenwich North Polar Distances.'

Mr. Gill's Expedition for observing the Opposition of Mars.

Mr. Gill's account of his observations and reductions in connection with his expedition to Ascension to observe the Opposition of Mars in 1877 has been received by the Council, and the printing of it has been already commenced. It will appear in the *Memoirs*.

The Library.

During the year, the cataloguing has been steadily continued. About 6000 titles are now complete, and less than 3000 remain to be written. The library committee have drawn up a list of books, consisting of star atlases, works of reference, &c., which are not to be taken out of the library.

Schwabe's Sun-spot Observations.

In 1864, in response to a request from Dr. De la Rue and Prof. Balfour Stewart, Hofrat Schwabe allowed his valuable series of Sun-spot observations to be deposited in the Kew Observatory, and at the same time, in a letter printed in the *Monthly Notices*, vol. xxxvi. p. 298, desired that after his death they should be considered to be the property of this Society. These manuscripts have hitherto remained at Kew, where considerable use has been made of them in the reduction of the Kew solar photograms; but in the course of last year they have been transferred to the Society's library at the request of the Council.

The Transit of Venus, 1882.

At the request of the Treasury, a committee has been appointed by the Royal Society to advise the Government upon the steps which it is desirable to take in order to secure observations of the Transit of *Venus* across the Sun's disk 1882, December 6. The committee—which consists of the Astronomer Royal, the President of the Royal Society, the President of the Royal Astronomical Society, Professor J. C. Adams, the Earl of Crawford and Balcarres, Dr. De La Rue, Dr. Huggins, Professor H. J. S. Smith, Professor Stokes, and Mr. Stone—has already commenced its labours.

OBITUARY.

The Council regret that they have to record the loss by death of the following Fellows and Associates during the past year:—

Fellows:—C. Raganootha Chary.
 Rev. R. S. Bower.
 H. W. Buxton.
 J. S. Eiffe.
 William Gray.
 W. A. Harris.
 William Lassell.
 Rev. R. C. Lumsden.
 Captain J. Williams.

Associates:—Baron Dembowski.
 Benjamin Peirce.
 Prof. C. A. F. Peters.

CHINTAMANNY RAGOONATHA CHARY, the head assistant in the Madras Observatory, died on February 5, 1880. He was attached to the Observatory for a period of nearly forty years, and served in succession in every grade under Captain Jacob and the present astronomer, Mr. Pogson. He contributed three papers to the *Monthly Notices*, viz.: 'On the Determination of Personal Equa-